

# SBI4U MOLECULAR GENETICS Unit Checklist

Name: \_\_\_\_\_



Mastery Checks may be attempted more than once and are not considered complete until  $\geq 70\%$  is achieved.

Notes and activities will be checked for completion & corrections.

Topic	Objective(s)	Key Concepts	Approx. # classes	Mastery Check Inc. # of attempts
1	<b>Ethics in Genetics:</b> <i>Explain social, ethical, and legal implications of genetics &amp; biotechnology</i>	<ul style="list-style-type: none"> <li>- Stem cells</li> <li>- GMOs</li> <li>- DNA fingerprinting</li> <li>- Gene patenting</li> <li>- Cloning</li> </ul>	1	X
2	<b>DNA Structure &amp; History:</b> <i>Describe historical scientific contributions that have advanced molecular genetics</i> <i>Explain the basic structure and components of DNA</i>	<ul style="list-style-type: none"> <li>- base pairing, A,C,G,T, hydrogen bonds,</li> <li>- Chargaff's rule</li> <li>- purines &amp; pyrimidines</li> <li>- sugar-phosphate backbone, phosphodiester bonds,</li> <li>- Anti-parallel, 3', 5' ends</li> </ul>	1	<input type="checkbox"/> Got It!
3	<b>DNA Replication:</b> <i>Explain how DNA replication occurs in cells and why it is important</i> <i>Describe the different repair mechanisms that can correct mistakes in DNA sequencing</i>	<ul style="list-style-type: none"> <li>- Leading Strand, Lagging strand, Okazaki Fragments, Replication fork/bubble</li> <li>- Enzymes: DNA Helicase, DNA Polymerases, Gyrase,</li> <li>- 3', 5', RNA Primers, SSBP's,</li> </ul>	2	<input type="checkbox"/> Got It!
4	<b>Transcription:</b> <i>Explain the process of transcription and its importance to living organisms</i> <i>Compare the structures and functions of RNA and DNA, and explain their roles in the process of protein synthesis</i>	<ul style="list-style-type: none"> <li>-Central Dogma: DNA <math>\rightarrow</math>RNA <math>\rightarrow</math>Protein</li> <li>- DNA <math>\rightarrow</math> mRNA, 5' to 3'</li> <li>-Genomes: Genes &amp; Non-Coding DNA, Introns, Exons</li> <li>- Nucleus, Promoters (TATA box), Template strand, RNA Polymerase, 5' cap, Poly-A tail, mRNA, Terminators, Processing</li> </ul>	2	<input type="checkbox"/> Got It!
5	<b>Translation:</b> <i>Explain the steps of translation as involved in the process of protein synthesis</i>	<ul style="list-style-type: none"> <li>- Cytoplasm</li> <li>- tRNA, rRNA,</li> <li>- Ribosome A-P-E sites, codons, start codon, amino acids, stop codon</li> <li>- Amino Acid interactions &amp; shape</li> <li>- Wobble hypothesis</li> </ul>	2	<input type="checkbox"/> Got It!
6	<b>Mutations:</b> <i>Explain how mutations can occur by changing the genetic material in cells and the effects of these changes</i>	<ul style="list-style-type: none"> <li>-Causes: Physical/Chemical, Spontaneous errors, Germ/Somatic</li> <li>-Types: Point (Substitution &amp; Insert/Delete), Inversion, Duplication, Translocation, Transposon</li> <li>-Effects: Silent, Missense/nonsense, Wobble Effect, Role of Introns, Non-Coding Sections</li> <li>-Significance: Loss of function, Enhanced Function, Advantage</li> </ul>	2	<input type="checkbox"/> Got It!
7	<b>Control Mechanisms:</b> <i>Explain how genetic expression is controlled in prokaryotes and eukaryotes by regulatory proteins</i>	<ul style="list-style-type: none"> <li>- Lac Operon &amp; Trp Operon</li> <li>- Regulators</li> </ul>	1	<input type="checkbox"/> Got It!
8	<b>Biotechnology</b> <i>Describe examples of genetic modification, and explain how it is applied in industry and agriculture</i>	<ul style="list-style-type: none"> <li>- PCR</li> <li>- RFLP</li> <li>- CRISPR</li> </ul>	1	X

# Molecular Genetics Terms to Know

- 3'
- 5'
- Adenine
- Aminoacyl-tRNA
- Anticodon
- Antiparallel
- BRCA Gene
- Central Dogma
- Chargaff's Rule
- Codon
- Complimentary Base-Pairing
- Cytosine
- Daughter Strand
- Deletion
- Deoxyribose Sugar
- DNA Fingerprinting
- DNA Gyrase
- DNA Helicase
- DNA Ligase
- DNA Polymerase I
- DNA Polymerase III
- DNA Template
- Double Helix
- Double Helix
- Downstream
- Elongation
- Exonuclease A site
- Expression
- Frame shift
- Franklin
- Gene Patenting
- Gene Regulation
- Genes
- Genetically Modified Organisms
- Glycosyl Bond
- Guanine
- Housekeeping genes
- Induced mutation
- Induction
- Initiation
- Insertion
- Inversion
- lac Operon
- Lagging Strand
- Large Subunit
- Leading Strand
- Missense mutation
- mRNA
- Mutagenic agent
- Mutation
- Nitrogenous Base
- Nonsense mutation
- Nucleotide
- Okazaki Fragments
- Operator
- Operon
- Origin of Replication
- P site
- Parental Strand
- Peptide Bond
- Phosphate Group
- Phosphodiester Bond
- Pluripotent
- Point Mutation
- Polypeptide
- Posttranscriptional
- Posttranslational
- Primase
- Promoter
- Promoter Region
- Purine
- Pyrimidine
- Reading Frame
- Release Factor
- Replication
- Replication Bubble
- Replication Fork
- Repression
- Reproductive Cloning
- Ribosome
- RNA Polymerase II
- RNA Primer
- Semiconservative
- Silent mutation
- Single-Stranded Binding Proteins
- Small Subunit
- Spontaneous
- Stem Cell
- Substitution
- TATA Box
- Termination
- Termination Sequence
- Therapeutic Cloning
- Thymine
- Totipotent
- Transcription
- Transcription Factor
- Transcription factors
- Transcription Unit
- Transcriptional
- Translation
- Translational
- Translocation
- Transposable
- tRNA
- trp Operon
- Upstream
- Watson & Crick

NOVEMBER 2022						
SUN	MON	TUE	WED	THU	FRI	SAT
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3

DECEMBER 2022						
SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17

*Homemade*